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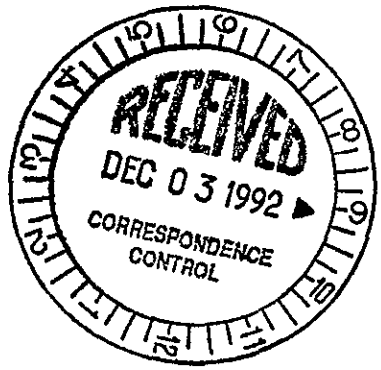

Mr. Roger F. Stanley
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Mr. Paul T. Day
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Dear Messrs. Stanley and Day:

HANFORD WASTE VITRIFICATION PROJECT (HWVP) ISSUE PAPER

I have enclosed a copy of the November 25, 1992, draft HWVP issue paper (Enclosure) for your information and comment. Please provide comments by December 4, 1992.

If you have any questions on the HWVP issue paper please contact me or your staff may contact Mr. Robert Gilbert of my staff on (509) 372-0618.

Sincerely,

for John H. Anttonen, Acting Program Manager
Office of Tank Waste Remediation System

DSD:RAG

Enclosure

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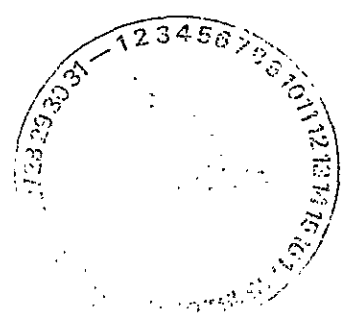

D R A F T
HWVP ISSUE PAPER
November 25, 1992

ISSUE

Should the Department of Energy (DOE) proceed with the construction of the Hanford Waste Vitrification Plant (HWVP) according to its current design and schedule?

Disposal of Hanford high-level waste (HLW), transuranic waste (TRU), and low-level waste (LLW), and the design and construction of pretreatment facilities (PT) and a vitrification plant are all closely interlocked. Decisions in each of these areas cannot be made in isolation, but rather consideration must be given to the entire system (i.e., the tank waste remediation system [TWRS].) The decision to plan for single-shell tank (SST) waste disposal, delay of DWPF startup, uncertainty with feed availability, and other technical issues combine to make this an appropriate time to consider whether DOE, WHC, Washington State Department of Ecology, Environmental Protection Agency, and other Hanford stakeholders have enough confidence in the current HWVP design and schedule to proceed. This HWVP issue paper addresses this question.

BACKGROUND

About 60 million gallons of radioactive and hazardous waste from Hanford's plutonium production mission is stored in 149 older SST and 28 newer double-shell tanks (DST) The Final Environmental Impact Statement - Disposal of Defense High-Level, Transuranic and Tank Waste, Hanford Site, (DOE/EIS-0113) and the associated 1988 Record of Decision (ROD) established as the Preferred Alternative the disposal of waste stored in DST by separating this waste by pretreatment into HLW, TRU, and LLW fractions; processing the HLW and TRU fractions into borosilicate glass at the HWVP and ultimately disposing the glass canisters in a Federal geologic repository; and disposing of the LLW fraction in grout vaults located on the Hanford Site.

With regard to defense waste stored in SST as sludge, saltcake, and pooled liquid, the ROD states that additional evaluations should be performed, and that treatment and disposal alternatives shall be addressed in subsequent environmental documentation (i.e., a future EIS process). The ROD specifies that the HWVP is to have sufficient flexibility, following modifications, to process SST waste should the decision be made to do this.

The HWVP Project is a $1.8 billion major system acquisition project. Preliminary design has been completed, and detailed design of the plant is in process. Clearing of the HWVP site began in April 1992, and the decision to start foundation construction is scheduled for January 1993.

The HWVP is a "sister" DOE liquid-fed melter vitrification plant to the Savannah River Defense Waste Processing Facility (DWPF), whose construction was initiated in 1984 and whose startup was originally scheduled for 1989. DOE plans were to incorporate the lessons learned from DWPF operating experience into the design and construction of HWVP. Currently, DWPF is five years behind schedule and startup is not projected to occur before June 1994.

Hanford DST waste characterization and associated pretreatment development activities have not progressed to the same degree as the HWVP Project. This is a result of characterization efforts being focussed on tank safety concerns and the decision not to use B Plant for pretreatment because of regulatory challenges in environmental and safety areas.

A number of challenges have arisen over the plans to process the LLW fraction of DST waste in the Grout Treatment Facility (GTF) and to dispose of the material onsite in grout vaults. Questions have been raised about the radionuclide activity level that constitutes LLW and the ability or performance of the grout vaults to isolate the radionuclides from the biosphere over the long-term. The completed GTF has not been authorized by DOE to begin operations.

During the past few years a number of tank safety issues have arisen associated with waste storage in the SSTs. The resolution of these safety issues has highest priority among all of the tank waste cleanup activities. The SST safety issues have created impetus to consider adding waste in certain SSTs as near-term feed for the HWVP, and to make plans to eventually process and vitrify all SST waste.

The TPA between the Washington State Department of Ecology (Ecology), Environmental Protection Agency (EPA), and DOE was signed in 1989, a year after the ROD. The TPA committed the DOE to a schedule for the total cleanup of the Hanford Site. One key milestone calls for the start of hot operations of HWVP in December 1999.

UNCERTAINTIES ASSOCIATED WITH THE HWVP PROJECT

There are a number of inherent uncertainties associated with the successful completion of HWVP design, construction, operation, and the long-term mission. These are:

- **Uncertainty in Feed Availability/Continuity:** With the decision to not use B-Plant as the pretreatment facility, the schedule for the development of the DST pretreatment system was adversely impacted. The current pretreatment approach uses a phased-development concept, in which certain well-characterized DST waste will be initially pretreated by simple, previously demonstrated processes (e.g., sludge washing, ion exchange, etc.). This will likely provide enough feed for five years of operation. Other DST waste may require pretreating using more complex, advanced processes (e.g., actinide separation), which will need to be developed, constructed, and brought on-line later during HWVP's operating life. The schedular, technical, and construction challenges inherent in this approach make a continuous feed supply uncertain.

- **Uncertainty in Waste Composition:** The radiological and chemical compositions of the waste in DSTs and SSTs are not adequately characterized. This results in uncertainties that impact the development of pretreatment processes, the performance of the HWVP, and the number of glass-filled canisters that will be produced.

- **The Required Plant Capacity is Uncertain:** The plant capacity that is needed depends on the quantity and composition of waste feed that will be vitrified, the schedule by which the feed is delivered to the plant, and the effective plant lifetime. The current glass production rate of 100 Kg/h may not be sufficient to fulfill the mission requirement of vitrifying both SST and DST waste within HWVP's design life.

- **Uncertainty in Benefits From DWPF Operating Experience:** To date, the lessons learned from DWPF, even before the plant begins operation, have been of significant impact to HWVP design. Lessons learned items are being incorporated into the HWVP design process. However, the startup of the DWPF facility has been delayed by technical problems. As the phasing between DWPF startup and operation and HWVP design and construction shortens, the benefit of DWPF operating experience diminishes.

  Savannah River HLW is reasonably well defined. However, significant changes have been made to the chemical processes used to prepare the waste for vitrification. DWPF recently changed to a late wash flow sheet deleting the use of hydroxylamine nitrate in the Salt Process Cell. DWPF has also changed the flow sheet in the Chemical Process Cell from formic to nitric acid. Hanford's HLW is not as well defined as Savannah River's and there is, therefore, some uncertainty in the required chemical processes. The HWVP design includes features to allow future modification to the process.

- **Uncertainty in the HWVP Interface with the Geologic Repository:** The HWVP must produce a waste form that meets the requirements imposed by the DOE Office of Civilian Radioactive Waste Management (OCRWM) program's geologic repository, which will in turn be licensed by the Nuclear Regulatory Commission. Geologic repository planning is proceeding in parallel with TWRS actions at Hanford. Some critical interfaces such as waste form acceptance criteria and TWRS's approach to meeting them have yet to be finalized. Potentially large variation in Hanford waste characteristics and the existing pretreatment strategy impose uncertainties on the range of HWVP waste form compositions and/or process control features that must be developed and qualified.

- **Uncertainty with the Disposition of Failed Melters:** The expected life of melters in HWVP is two to three years. There is currently no method for disposal or storage of melters from HWVP. Melters will contain residues of TRU and HLW and disposal onsite is not permitted per current environmental regulations. Plans for disposal of melters need to be in place prior to start of operation of HWVP.

- **Uncertainty with Operating Efficiencies with the Current HWVP Design:** HWVP as designed and planned to be operated is judged to have an operating efficiency significantly less than required in the Function Design Criteria. Operational efficiency is impacted by lack of equipment laydown space, inadequate supply of spare

- capacity may not satisfy the mission of treating all SST and DST waste. An additional vitrification facility or additional pretreatment facilities with increased HLW generation may be

parts, and insufficient space to package solid waste for shipment from the facility. This issue raises concern regarding HWVP's capability to efficiently treat all tank waste.

SENSITIVITIES

The decision on how best to resolve the HWVP issue must be sensitive to:

- o **The State of Washington and public confidence that the DOE will clean up the Hanford tank wastes** - Confidence in DOE meeting its commitments is best engendered by early, substantive TWRS cleanup actions. Evaluations of HWVP schedule must be addressed openly and address Hanford stakeholder concerns.

- o **The Tri-Party Agreement** - Decisions to change plans for HWVP must be agreed to by the DOE, the Washington State Department of Ecology, and the EPA. State political leaders perceive DOE as making unilateral decisions to alter the Tri-Party Agreement. Ecology has been disapproving individual change requests, in part, because an overall TWRS strategy has not be presented.

OPTIONS

1) Proceed with the construction of the HWVP according to its current design and schedule.

Pro:

- o Allows DOE to meet the current Tri-Party Agreement milestones for construction and hot operation of HWVP.

- o Provides near term objective demonstration of the DOE intent to cleanup Hanford improving public confidence in the Hanford cleanup program.

- o It is the fastest way for the DOE to start immobilizing HLW providing real safety improvements.

- o Provides incentive to accelerate other TWRS program elements to support HWVP.

- o Provides increased DST space sooner than option 2.

Con:

- o Capacity may not satisfy the mission of treating all SST and DST waste. An additional vitrification facility or additional pretreatment facilities, with increased LLW generation may be required to treat all SST and DST waste. This lack of forethought could erode DOE's credibility.

- o Does not provide additional time for characterization, retrieval, and pretreatment program elements to catch up and reduce the risk of HWVP feed interruption after several years of operation.

- Reduces Hanford's ability to incorporate DWPF operational lessons learned into the HWVP design.

- Near-term construction expenditures compete with Hanford's need to provide more focus and resources on other high priority TWRS programs.

2) Delay the construction of the HWVP to design a facility to meet the mission of treating SST and DST waste that reflects the results of a TWRS systems study that includes retrieval and pretreatment.

Pro:

- Allows development of a facility with an optimized vitrification capacity that will handle all DST and SST wastes. This should lower overall program cost by reducing the risk of needing additional facilities.

- Allows time to develop an integrated systems approach for TWRS such that characterization, retrieval, and pretreatment program elements will support HWVP.

- Allows more time to incorporate DWPF operational lessons learned into HWVP design.

- Allows a more focussed application of Hanford resources to other high priority TWRS programs.

- Allows time to evaluate current plant design deficiencies (e.g., operating efficiencies and solid waste disposal)

Con:

- Requires renegotiation of significant number of Tri-Party Agreement milestones.

- A systems engineering approach and the resultant required effort in retrieval and pretreatment activities may not be viewed as objective evidence of the DOE commitment to cleanup Hanford. This could reduce public confidence in the Hanford cleanup program.

- In the near-term, defers immobilization of HLW.

- Defers providing increased DST space relative to option 1.

CORRESPONDENCE DISTRIBUTION COVERSHEET

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Subject: HANFORD WASTE VITRIFICATION PROJECT (HWVP) ISSUE PAPER

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